Incoming
M/039/0002
Peter
7459

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Div. of Oil, Gas & Mining

Form MR-REV-att (DOGM – Revise/Amend Change Form)
(Revised September 14, 2005)

Application for Mineral Mine Plan Revision or Amendment

Operator: Redmond Minerals, Inc.

Mine Name: Redmond Minerals File Number: M/ /

Provide a detailed listing of all changes to the mining and reclamation plan that will be required as a result of this change. Individually list all maps and drawings that are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise or amend the existing Mining and Reclamation Plan. **Include page, section and drawing numbers as part of the description.**

DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
9 ADD	9 REPLACE	9 REMOVE	pg. 8 Sec 106·2 added description of "Trophy Rock package."
9 ADD	9 REPLACE	9 REMOVE	pg 12 Sec. 106·8 added elevation #'s to well data.
9 ADD	9 REPLACE	9 REMOVE	pg 13 Sec. 106·8 Fixed Typos "Slat" - "seveages"
9 ADD	9 REPLACE	9 REMOVE	pg 14 Sec 106·8 Inserted text referring to Map GE-02 (USGS I-1304-A)
9 ADD	9 REPLACE	9 REMOVE	pg 16 Sec 109·4 defined "acceptable grades" as less than 3H:1V
9 ADD	9 REPLACE	9 REMOVE	pg 18 Sec 109·5 Removed vague words - some pits & some slopes.
9 ADD	9 REPLACE	9 REMOVE	pg 19 Sec 110·2 - referred "key" roads to maps. Refered drills hole to R647-4-108
9 ADD	9 REPLACE	9 REMOVE	pg 18 Sec 110·1 Removed statement about 'parts of the mine are Grandfathered"
9 ADD	9 REPLACE	9 REMOVE	pg 20 Sec 110·2 added statement concerning sinkholes.
9 ADD	9 REPLACE	9 REMOVE	
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9 ADD	9 REPLACE	9 REMOVE	

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments and obligations, herein.

Rusty Bastian
Print Name

Rusty Bastian President - Redmond Minerals
Sign Name, Position

7/13/2016
Date

Return to:

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
Phone: (801) 538-5291 Fax: (801) 359-3940

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File #: M/ /
Approved:
Bond Adjustment: from ($)
to $

a. Food Salt System

The material that is moved through the food salt system is first sent through the Gleason Crusher and then elevated into a storage bin. The material is then processed by a hammer mill and then elevated into a set of screens. The oversize material is moved through another hammer mill and then re-elevated into the screens. From these screens, four different products are made and stored in five enclosed bins.

b. Trophy Rock Packaging System

Trophy rock is dumped into a covered bin by a front end loader. The material is then moved by an apron feeder inside the building and then onto two other conveyor belts. The material is weighed and wrapped with plastic. Salt rocks within the weight and quality range between 6lbs. and 32lbs. will be used and sold as Trophy Rock for Big Game attractants.

2. Fines System

The fines system is made up of one conveyor and two transfer points which move 5/8" minus material from the primary system to the cone storage bin.

3. Cone Crusher

The cone crusher system consists of four covered belts and a cone crusher that serves as a recirculation loop. The cone crusher is fed material that is 6" minus and reduces this material to 5/8" minus. This material is then run through the primary screen again.

a. Road Salt System

From the cone storage bin, the material can be moved either through the Milled Products System or through the Road Salt System. The material that moves through the Road Salt System is treated with brine water, which is pumped from a sump in the salt mine, and YPS (Yellow Prussiate Soda) as it passes through the pug mill and then transported to the storage piles via four belt conveyors. At maximum capacity, the Road Salt Storage piles will fill approximately 7 acres of ground (see Maps SF-01 Site Facilities Map and SF-02 Site Facilities Map – Detail).

b. Milled Products System

The material that is moved through the mill is first dried. The material then is elevated and transferred into the Midwestern Screen. The oversized material is run through a hammer mill and back into the elevator. From the Midwestern Screen, six different products are made by mixing different gradations. These products are stored in covered concrete bins.

c. Warehouse Mixing and Bagging System

Dried and milled salt is moved from the mill storage bins to the loader dump bin by front end loader. The material is moved by auger to an enclosed elevator and can then be directed to either the main bagger or the storage bins. From the storage bins, the material is moved either back to the elevator or to the feed belts. If the material is moved to the elevator, it is then moved to the bagger. If the material is moved to the feed belts, it is moved across the feed belts and into the mixing system. The mixing system can be supplied from the storage bins, the trace minerals dump, or the loader dump point.

Existing Vegetation

106.8 - Depth to groundwater, extent of overburden, geology

The groundwater in the area originates from the farmland and hills west of the mine and flows to the east. The topography west of the mine is such that is causes the surface water to cross the diapir in the area of the Bosshardt Mine. It is likely that the bedrock follows the same general contour as the surface topography which directs the groundwater toward the old Bosshardt Mine.

The present source of water for the mine is from a well, #63-2334, that is about 1 mile west of the mine (see Map HD-03) owned by Bosshardt Inc. This well was completed in May of 1980 to a depth of 236 feet. The static water level in the well was 180 feet or 5097 feet in elevation. It was completed in alluvial material consisting of clay, silt, gravel, and cobbles.

Map HD-03 shows well #63-368 located in close proximity to the west of the Mine. According to the Division of Water rights, this well doesn't exist and had a No Proof Required filing.

There are many underground wells that currently in use for watering livestock just to the east of the mine site. The ground water information for these wells is as follows:

Hampton Farming and Livestock Well #63-92 was drilled to a depth of 55 feet. Static water is found in this 4" diameter well at a depth of 14 feet or 5076 feet in elevation. It was completed in alluvial material consisting of clay, sand and gravel.

Gate and Cindy Nowers Well #63-349 was drilled to a depth of 110 feet. Static water is found in this 4" diameter well at a depth of 4 feet or 5086 feet in elevation. It was completed in alluvial material consisting of clay and gravel.

Marvin C Jensen Well #63-346 was drilled to a depth of 97 feet. Static water is found in this 4" diameter well at a depth of 13 feet or 5077 feet in elevation. It was completed in alluvial material consisting of clay, sand and gravel.

In the area near the south underground mine and specifically the existing French drain alluvial flows of ground water have been located at or near the contact point between the alluvium and bedrock as noted in the Whetstone Report that is included in Appendix C. The alluvial flows likely originate from the fields to the West of the mine and flow down gradient to the east, as water inflow rates have been noted

to increase during times of irrigation. The underground workings are completely dry other than water that has been directed into the mine for use in the construction of ventilation shafts or that used for dust control. In areas where the salt has been removed to facilitate the construction of ventilation shafts, portals, etc., water enters the mine from the alluvial structures adjacent to the mine. The interior areas of the salt deposit are inherently dry. It is important to note that the salt deposit does not contain any liquid in the form of brine or water, all of the brine contained in the mine are due to external sources either from the adjacent alluvial structures, rain fall, or by intentionally bring the liquids into the mine by the operator. The operator has chosen to store brine in several areas of the mine due to the inability to discharge or otherwise dispose of brine. Most of the ground water inflow that has been detected have occurred at an elevation of between 5050' and 5070' above sea level.

As a result of the completion of the technical reports in Appendix C, a water system has been installed to mitigate the effects of the water produced by pumping the French Drain. This system collects the water and pumps it to the east side of the diapir and deposits it in a storage pond. Since the construction of this system the mine has not detected any further subsidence events.

The water currently being captured from the French drain has been sampled several times since the time that the Whetstone paper was written. The very first sample taken directly from the French drain indicated the water contained 3% NaCl. Tests since that time have indicated a much lower level of salt concentration. The average level of salt concentration is 1350 ppm or 0.135% NaCl.

The geologic units and their description are shown on the Geologic Map GE-01. The following is a general geologic description of the area:

Coalesced alluvial fans - This formation occupies the western half of the property only to a depth of about 16' to 165' from the surface. The area consists of deposits from the Holocene and Pleistocene periods. The deposits are brown to dark-brown, thin to thick bedded, commonly cross-bedded, moderately well-sorted, unconsolidated to well consolidated sediment, cemented mainly by calcium carbonate. The deposit consists of silt, sand, granules, and pebbles that were washed into place by running water not confined in specific channels. These deposits provide an excellent source of sand and gravel.

Intrusive masses of the Arapian Shale - Generally light gray marked by pale-red blotches, but, in places, wholly drab gray or reddish brown. Calcareous mudstone, thin-to medium-bedded; locally massive. Includes intercalated, thin, lenticular beds and seams of yellowish-gray to light-brown siltstone and sandstone, and a few beds of limestone. Contains thick beds of rock salt (halite), gypsum, and other evaporites. Selenite crystals are abundant on many outcrops of marine saline-basin origin. Formation is complexly deformed and shows evidence of intense compressions. Weathers to badlands topography. The salt (and possibly other evaporites) in the Arapien Shale has probably been moving ever since it was deposited during the Middle Jurassic. Some of this movement has been slow, almost imperceptible upwelling. At times, however, the salt appears to have surged upward rapidly, forcing up the overlying mudstone of the Arapien Shale, which, in turn, bowed up the country rock to form elongate, narrow diapiric folds. Subsequent solution and removal of the salt resulted in collapse of the upwarps. Such major upwelling's of the salt may have occurred during the Late Cretaceous, early Paleocene, and late (?) Oligocene or Miocene. A localized upward surge of the salt, probably during the Pleistocene, apparently deformed semi-consolidated sediment in the southern part of Sanpete Valley. Thus, the formation has severances; the depositional age is Middle Jurassic, but emplacement ages - the geologic age of movements - have changed repeatedly. Thickness uncertain because of intense deformation; estimates range from about 4,000 ft. to as much as 13,000 ft.

Unconsolidated Deposits - Only a small portion of the mine falls under his category. The area consists of deposits from the Holocene and Pleistocene periods. The deposit consists of dark-brown

to dark-gray, thin- to thick-bedded, faintly cross bedded sediment. The commonly unconsolidated deposits consist of clay, silt, sand, granules that were washed into place by running water not confined in the fans. The material was derived from the disintegration of units exposed in the adjacent uplands. Thickness ranges from a thin film to about 25 feet.

Map GE-02 shows USGS Map I-1304-A with a detailed table of the geologic characteristics and uses of surficial and bedrock units in the Redmond quadrangle, Sanpete and Sevier counties, Utah (1981).

106.9 - Location & size of ore & waste stockpiles, tailings & treatment ponds, and discharges

One small stockpile of raw salt ore from the mine will be created just south of the primary crusher to serve as a buffer between the mine and the mill. This stock pile will be maintained at less the 20,000 tons. This stockpile will consist of run of mine rock that can be fed into the crusher in the case that the salt mill is crushing faster than the mine is hauling it up. Finished product piles will be created just north of the mill. These piles will vary in size, but should not exceed 500,000 tons total. These product piles can be seen in detail on the Site Facilities Map, SF-01.

Waste salt, which is primarily superfine salt or salt under 30 mesh is being used to reclaim the old Bosshardt mine. Currently, and for the foreseeable future, all waste salt will be pushed into the old mine. Some older salt waste piles exist and are noted on the Site Facilities Map, SF-01.

Unprocessed clay will be stockpiled in several locations depending on the grade of the material. Raw clay will be placed on pads where is sampled to determine the quality of material. Once this is complete the material will be separated and stockpiled in the appropriate locations. These piles will vary in size, from 100 tons to 100,000 tons. These piles are shown in detail on the Site Facilities Map, SF-01.

Various piles of clay waste materials exist throughout the mine property. In the future, these piles will be re-graded and reject material will be placed in abandoned pits. The location of these piles can be seen on the Site Facilities Map, SF-01.

There are no tailing piles on the mine property.

There are several small water retention ponds on the property, as shown on the Site Facilities Map. There are no areas that water is treated for discharged from the site.

Currently, water is collected from the French Drain and moved to a small pond at the south end of the mine site. This water has been sampled multiple times and has been measured to contain 1350 ppm or 0.135% NaCl. This pond also catches surface drainage water from the farmland to the west. The French Drain was put in place over 30 years ago in an effort to minimize the amount of water entering the mine. Currently the operator has captured this water and is pumping it across the salt deposit to minimize contact with salt and reduce the possibility for contamination. This system was implemented in order to reduce or eliminate contamination of the water by contact with the salt. This system picks up fresh water and moves it across the salt deposit without contamination that would otherwise result.

The Site Facilities Map (SF-01) shows 4 Trash Pits and 2 Equipment Storage Areas. Trash Pits are used to contain scrap metal until it can be sold and are not used to dispose of any "Trash". Equipment Storage Areas are used for storage of equipment not currently in use in the operation.

R647-4-108 - Hole Plugging Requirements

All exploratory drill holes will be plugged in accordance with R647-4-108.

Once the pre-mining state has been established, the TDS levels are expected to return to normal pre-mining levels. There is enough public information and available knowledge to suggest contamination to wells down gradient from the Mine in the surrounding area is unlikely.

Potentially deleterious materials that are stored on site include fuel oil, engine oil, and other lubricant oils. Fuel oil is stored in tanks with secondary containment. Other oils are stored indoors on concrete floors. Therefore, any potential spills can be easily cleaned up before contamination of soil or groundwater (despite the depth) can occur.

The waste salt stockpiles (see Site Facilities Map SF-01) are located in depressed areas over salt formations. Any water that is leached from these piles during precipitation will remain on site around these piles and seep into the ground and into the salt formations.

109.2 - Impacts to threatened & endangered wildlife/habitat

Typical wildlife present in the area are skunks, fox, squirrels, badgers, raccoons, mule deer, birds, lizards, snakes, etc. The site has been actively mined on private property for more than 50 years and any potential sensitive wildlife habitat has been disturbed even before Redmond Minerals commenced operations.

109.3 - Impacts on existing soils resources

There has been no effort in the past to store topsoil for reclamation work. Topsoil will be separated and stockpiled from any future disturbances. There are no riparian or wetland areas within the boundaries of the mining area. There are no threatened or endangered plant species in the area as evidenced from the list of native plant species in the re-vegetation report.

109.4 - Slope stability, erosion control, air quality, safety

Slope Stability

The salt mines were opened up more than 50 years ago. Redmond Minerals has been excavating underground to remove rock salt. All the rock salt that is removed is processed and sold. Therefore, there are no continual surface impacts and disturbance due the underground mining of salt. During mining operations slopes will be maintained in safe condition in cooperation with MSHA and in meeting guidelines from 30 CFR part 56 and 57. These high walls are regularly inspected by MSHA and maintained to provide a safe work environment for the workforce. After mining these high walls will be supported by pushing in and reducing slopes to acceptable grades with a slope of less than 3H:1V.

In recent past the Bosshardt Mine collapsed. The cause of the mine collapse has been identified to be of two parts, the first of which was from directing fresh water into the mine tunnel for storage. This practice eroded the sill pillar of the mine and widened the tunnel out to the point of collapse. This practice has been eliminated by installing a pumping system to move the fresh water across the salt diapir and prevent future dissolution of the salt deposit while mining is ongoing. The second cause is the mine design or lack of engineering controls in the mining process used at the time. The mine that collapsed was developed with dimensions that exceed the recommended mining widths and sill pillar thicknesses. All new mining will be engineered to maintain a stable mine environment and to prevent mine collapse and future subsidence. With proper mining methods and prudent mine design, this problem can be eliminated. Appendix C contains the technical reports from both Whetstone and Agapito & Associates related to the collapse of the Bosshardt Mine.

Erosion

Mine Gate

109.5 - Actions to mitigate any impacts

To mitigate the impacts of slope stability, sink holes and demonstrate a long term factor of safety is noted above in 109.4. Waste rock, rejected material and overburden will be used as fill in pits that require backfill and will not be used in the future. It would also be used to reclaim slopes to the extent possible to increase slope stability and safety. There is adequate on-site use for the rejected material. Therefore, the rejected material will not be disposed off-site. Also, there is enough waste and overburden material on site that no additional fill material will need to be brought in from off site for reclamation.

All top soil and other overburden soils that can be used for reclamation will be stockpiled separate from other overburden that is not suitable for re-vegetation. Topsoil will be used within a few months of excavation, if possible, to re-vegetate existing sites. Any topsoil that is not to be used for re-vegetation within about one year (given the fact that re-vegetation needs to be initiated during late fall to early winter to maximize the probability of success) of excavation will be re-vegetated with a seed-mix with species chosen from the list proposed in the attached Vegetation Study (Attachment 2).

R647-4-110 - Reclamation Plan

110.1 - Current & post mining land use

Pre-mining Land use was agricultural, mainly livestock grazing. Post mining land use being considered is both agricultural and to convert some of the property and buildings into a museum.

110.2 – Reclamation of roads, high walls, slopes, drainages, pits, etc.

Paved roads near the entrance to the mine and certain unpaved roads will be retained for farming operations. All other unpaved roads will be reclaimed by re-grading (where necessary), ripping and seeding. These roads are identified on attached maps. All salt and clay high walls will be reduced to a 3H to 1V slope. One of the other impacts of steeper slopes is erosion. In this case, there is minimal potential for off-site erosion because the material will erode right into the pits rather that out of the pits. The old Bosshardt Mine will be filled with waste salt and regraded as part of the ongoing operation. Map RT-01 Reclamation Treatments Map identifies all areas and types of reclamation. This includes undisturbed areas, the reclamation area boundary, major grading contours, re-grading earthwork volumes by area, pre-law disturbance, buildings and the areas that have been regarded and are waiting release by UDOGM. All areas within the reclamation boundary shown on map RT-01 will be reclaimed to meet standards in R647-4-111. The re-vegetation treatments for the reclaimed areas are discussed in section 110.5 below.

Haul Road South of North Mine portal

Hydrology Maps 01 and 02 show the drainage patterns for the mine area. It is expected that after reclamation water will accumulated in the low areas of abandoned clay mine pits. Efforts will be made to ensure that natural drainage channels are not affected by these areas.

Access to horizontal tunnels in salt mines will be restricted by installation of metal gates when the mine is to be temporarily closed. When it comes time to permanently close the portals suitable material will be pushed into the portal entrance at a distance of 2 times the height of the portal before the slopes of the area are to be regraded and reclaimed. Appendix D shows the proposed method of closing the portals when mining is complete. There are four vertical air shafts that intercept the surface on the mine property. Appendix E shows the two alternative methods of permanently closing the shafts when they are no longer needed. These drawings show both the existing shaft layout and the proposed closure plan. A copy of the UDOGM's approved shaft closure plan has been included in Appendix E and will be used as a minimum guideline. The operator may choose to increase the size of the plug depending on existing conditions. The approximate maximum diameter of the ventilation shafts are 8'.

It is expected that no more small drill holes will be drilled on site (e.g., for groundwater exploration). Larger exploratory holes may be excavated to locate material veins. These holes will be closed using the excavated overburden and compacted. If any other holes are drilled, they will be capped and sealed in accordance with R647-4-108.

In the past, trash, scrap metal and other nonhazardous debris are being disposed in a trash pits (see Surface Facilities Map SF-01). This practice is no longer being used. These areas will be cleaned up by removing all existing trash and then back filling or regrading by using overburden or other suitable materials. Each pit will then be reclaimed as shown on the Redmond Treatments Map and Revegation Seeding Map SD-01.

Clay waste and mining areas will be regraded to slopes less than 3H : 1V. These areas will then be disked, treated with manure at a rate of 5 tons per acre, and seeded. This treatment is shown as Type A on the Re-Vegetation Treatments Map, SD-01.

Salt storage piles will either be sold and removed from the site or regraded, ripped as necessary, covered with 6" of topsoil, fertilized with composted manure and reseeded. Salt waste dumps will also be reclaimed using this treatment method. This reclamation treatment is listed as Type B on the Re-Vegetation Treatments Map, SD-01.

Clay product piles and processing areas will be regraded to slopes less than 3H : 1V. These areas will then be treated with manure and broadcast seeded. This treatment is listed as Type C on the Re-Vegetation Treatments Map, SD-01.

Salt mining areas, roads, and other minor disturbances will be regraded to slopes less than 3H : 1V. Any sinkholes found during the reclamation process will be either regraded or backfilled to acceptable standards. These areas will then be disked, treated with composted manure and then seeded. This treatment is listed as Type D on the Re-Vegetation Treatments Map, SD-01.

All water retention ponds will be regraded, covered with 12" of topsoil, fertilized with composted manure and reseeded, as shown on RT-01. This reclamation treatment is listed as Type E on the Reclamation Treatments Map, RT-01.

At the end of the mines life and the completion of reclamation the culvert that is used to access the pipe leaving the French Drain will be excavated and removed. At this time the pipes will be capped and the underground water will be allowed to resume its natural course over the top of the salt diapir. All pipes leaving this area will be capped on both ends. Tanks and pumping equipment will also be removed and the area will be regraded to proper slopes. It is possible that decommissioning the French drain will cause some short term subsidence in the immediate area. The subsidence should be minimal and will not persist as new channels are created for the alluvial water to flow from the west to east as was the case before the disturbance existed. This area will be fenced off until it is deemed safe to prevent inadvertent access. The areas adjacent to the French Drain will also be regraded when it is deemed safe to do so.

The mine does not have any tailings areas or leach pads.

110.3 - Description of facilities to be left (post mining use)

Map SF-02, Site Facilities Map – Detail, shows the locations of the 15 buildings within the mine area. It includes a table listing the buildings with their size, construction type, use, and whether or not it is to be reclaimed. Buildings 7-17, 22 and 23 should be evaluated at the end of the mine life to determine the possibility that those being maintained will support the post mining land uses, which includes agriculture and the conversion of some of the property and buildings into a museum.

110.4 - Description or treatment/disposition of deleterious or acid forming material

No material with acid-forming potential has been encountered to date and is not expected to be encountered in the foreseeable future. Potentially deleterious materials that are stored on-site include fuel oil, engine oil, and other lubricant oils. Fuel oil is stored in tanks with secondary containment. Other oils are stored indoors on concrete floors. Therefore, any potential spills can be easily cleaned up before contamination of soil or groundwater can occur. Chemicals added to some of the Salt are YPS (Yellow Prussiate Soda), MgCl and Gylcerin. At the end of the Mines life these materials will be